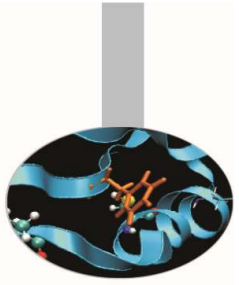
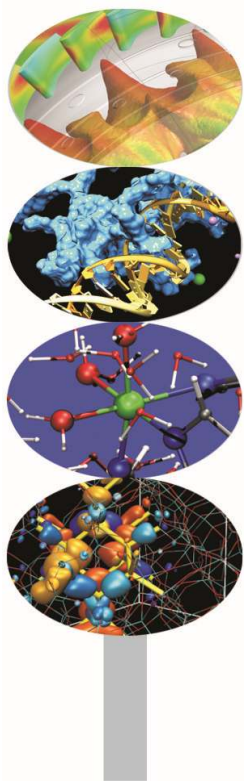
CINECA SCAI
SuperComputing Applications and Innovation



MPI introduction
- *examples* -



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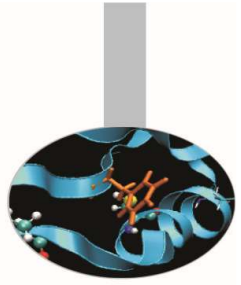
Example: «ping-pong»

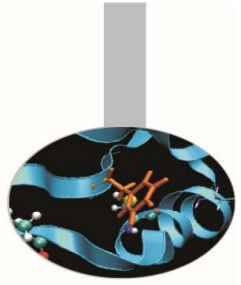


ping-pong is perhaps the simplest example of point to point communication.

In a two process execution of a ping-pong program the process 0 sends a message to process 1 and this sends it back to process 0. This could be easily generalized in a round robin fashion if more than two processes are engaged.

Try modifying the Hello World example in order of realizing round robin communications.

Example: «Pi by quadrature»

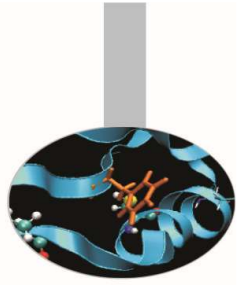


It is known that the mathematical constant π can be approximated by computing the following formula:

$$\pi = 4 \int_0^1 \frac{1}{1+x*x} dx$$

The value of the above integral can be approximated by numerical integration, i.e. by computing the mean value of the function $f(x) = \frac{1}{1+x*x}$ in a number of points and multiplying per the x range. This can be easily done in parallel by dividing the [0,1] range into a number of intervals.

Example: «Pi by quadrature»



Thus the program may be sketched this way:

- (if my_rank == 0) get number of intervals for quadrature
- Broadcast number of intervals to all the processes
- Assign the intervals to the processes (they should not overlap)
- Sum function values in the centre of each interval
- Divide by interval range and multiply by 4

Source code: *Pi_integral*